

STANDMODEL

Development of dynamic yield models for conifers, broadleaves and mixtures

PROJECT TEAM

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BACKGROUND

Better resource information is one of the key needs for investment decisions. Growth and yield models, including those developed under the DYNAMIC YIELD project, are an important component of any decision-making framework. Models developed to date cover Sitka spruce, lodgepole pine, Norway spruce, Douglas fir and Scots pine. These have an operational interface called GROWFOR, which is licensed by COFORD and which is now in use by Irish foresters. The models are also incorporated into Coillte's volume forecasting systems. Given the increase in the use of both broadleaves and mixtures under grant-aided afforestation, further models need to be developed. The STANDMODEL project is currently developing new dynamic yield models for ash and Japanese larch and is examining ways in which growth and yield in mixtures can be modelled.

OBJECTIVES

- Produce new dynamic yield models for Japanese larch (thinned and unthinned) and ash (thinned) and integrate these into the existing Irish Dynamic Yield Model User Interface.
- Investigate the potential for generating growth forecasts for species mixtures using existing model combinations.
- Investigate the potential for utilising National Forest Inventory plot data in validating and strengthening existing dynamic yield models and in generating new ones.
- Develop additional functionality for the Irish Dynamic Yield Model User Interface in the form of:
 - a) user-defined assortments;
 - b) optimisation/goal seeking capability;
 - c) facility to cater for mixtures .

PROGRESS

Members of the project team attended the meeting of COST ACTION FP0603: *Forest models for research and decision support in sustainable forest management* where they met other researchers working in the area.

During the year, 40 validation plots of Japanese larch were established nationwide and standing data were collected. The 40 plots were selected across geographic and age strata. In each plot, 7 volume sample trees were selected, felled and measured (Figure 1) and recorded for use in the independent validation of the Japanese larch model. The purpose of this work is to provide independent stand and stem volume verification data for Japanese larch, once a dynamic model has been produced for this species.

Over the last 10 years, 100 Japanese larch plots have been maintained nationwide and have been used as a data source for the development of a new dynamic yield model for Japanese larch, which will be added to the GROWFOR package when completed. Just like for the other species currently available through GROWFOR, it is necessary to



Figure 1: Sectional measurement of a Japanese larch sample tree, Virginia Forest, Co Cavan.

independently validate any model produced with data not used in the development of the model. It is suggested in some publications that, after successful validation, all data from the original dataset and the validation data set should be combined to produce the final model. This means that no data are ignored in the final model.

The 100 plots established in ash stands in 2007/2008 were maintained and data were collected in the dormant season 2008/2009.

User-defined assortments for Scots pine and lodgepole pine were uploaded onto GROWFOR. Additional work on the development of user-defined assortments in Sitka spruce and Norway spruce was begun.

ACTIVITIES PLANNED

- Data for the 100 ash plots will be collected in the dormant season 2009/2010.
- Work will continue on user-defined assortments in conjunction with Dr Lance Broad.
- Collaboration with SCION Research Institute in New Zealand on the development of models similar to those used in GROWFOR.

OUTPUTS

Recent Developments in Irish Stand and Stem Modelling under the COFORD STANDMODEL and TREEMODEL Projects. Presentation to ITC Technical Group, Portlaoise, 14 July 2009 by Paddy Purser

Dissemination of the project at a course on Bayesian Nonparametric mixture modelling, NUIG, 14 December 2009 by Andrew McCullagh

Nieuwenhuis, M. 2009. *COFORD's PLANSFM Research Programme: Planning and Implementation of Sustainable Forest Management.* Presentation to the COFORD Council, AFBI Field station, Hillsborough, Co Down, 24 July 2009.

Harper, C. and Nieuwenhuis, M. 2009. *PLANSFM - Planning and implementation of sustainable forest management* [Poster presentation.] UCD School of Agriculture, Food Science and Veterinary Medicine Research Day, 8 December 2009.